Modeling IRA Accumulation and Withdrawals

Abstract - *Empirical analysis of IRA accumulation and withdrawal patterns is limited because information about IRA balances and flows is not available for a sample of taxpayers. This paper combines survey data on IRA balances with individual tax return data on IRA flows to study IRA accumulation and withdrawal patterns across cohorts. The analysis shows that IRA rules such as penalties for early withdrawals and minimum distribution requirements have predictable effects on IRA flows. The estimated propensities to contribute to IRAs, rollover from pensions, and withdrawal from IRAs are used to project IRA flows and balances in the near to medium term.*

INTRODUCTION

The Taxpayer Relief Act of 1997 changed policy towards Individual Retirement Accounts (IRAs) in several ways. Income limits that determined eligibility for traditional deductible IRAs were raised, a new backloaded (Roth) IRA was introduced, and education expenses and first time home purchases were added to the list of allowable reasons for withdrawing funds from IRAs before retirement without penalty. Since 1997, further modifications to IRA law have been suggested, including more reasons for non–penalized withdrawals and changing minimum distribution requirements for taxpayers older than $70\frac{1}{2}$.[1]

There is limited empirical basis for predicting the budgetary consequences of the proposed rule changes or evaluating how those changes would impact effective taxation of IRA saving, however, because not much is known about individual patterns of IRA accumulation and withdrawal over the life–cycle. In aggregate, IRA balances have grown dramatically, and now account for about one–fourth of all dedicated–retirement accounts (employer pensions and individual accounts). Although IRAs are an important part of total saving, little is known about household–level accumulation and withdrawal behavior because micro data on both IRA balances and flows for the same taxpayers are generally not available.

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[1] See TIAA-CREF (1998) for a description of minimum distribution requirements and proposed changes.

This paper combines data on IRA balances from the 1992 and 1995 Survey of Consumer Finances (SCF) with data on IRA contributions, IRA withdrawals, and lump sum rollovers from pensions to IRAs in the 1992 and 1996 Statistics of Income (SOI) tax return files to analyze IRA behavior across age groups.[2] Although individuals cannot be matched across the two data sets, inferences can be drawn about cohort–level behavior, because age is a common variable to the two data sets. For example, given IRA balances by age in the SCF and IRA withdrawals by age in the SOI, both the probability of making a withdrawal and the average withdrawal to balance ratio by age can be computed.

The patterns of cohort–level behavior observed by using the two data sets in conjunction are very clear, and suggest that the various age related IRA rules, such as early withdrawal penalties and minimum distribution requirements, have first–order effects on taxpayer behavior.[3] Also, the estimated accumulation and withdrawal patterns are relatively stable over the time periods considered, and are therefore useful for modeling IRA flows and balances at the cohort–level. The forecasting model developed here implies (barring changes in rules such as minimum distribution requirements) that withdrawals from IRAs will grow rapidly in the next decade as the large IRA holdings of young and middle–age taxpayers are subject to higher withdrawal rates.

AGGREGATE TRENDS IN IRA BALANCES AND FLOWS

Aggregate IRA balances were insignificant in 1980, but by the end of 1997, approached $2.0 trillion (Fronstin, 1998).[4] Table 1 shows the sources of growth in

TABLE 1
AGGREGATE IRA BALANCES AND SOURCES OF CHANGE, 1981 TO 1996
(BILLIONS OF DOLLARS)

Year	End of Year Balances	Deductible Contributions	Taxable Withdrawals	Interest & Dividends	Estimated Capital Gains	Rollovers & Residual
1985	$234.7	$38.2	n.a.	$14.2	$8.4	$18.4
1986	319.2	37.8	n.a.	13.1	12.6	21.0
1987	389.7	14.1	n.a.	19.8	–3.1	39.7
1988	451.3	11.9	11.1	23.9	20.2	16.8
1989	546.0	10.8	13.9	25.7	42.0	30.1
1990	634.4	9.9	17.6	28.7	–11.5	78.9
1991	773.5	9.0	20.6	25.1	45.9	79.7
1992	863.6	8.7	26.3	19.6	42.8	45.2
1993	993.0	8.5	27.1	20.3	29.7	98.0
1994	1,079.4	8.4	33.1	23.1	–12.2	100.2
1995	1,352.0	8.3	37.3	28.1	208.9	64.6
1996	1,578.4	8.6	45.5	33.5	167.0	62.8

Sources: Balances are from Fronstin (1998), interest and dividends are unpublished BEA estimates based on average market interest and dividend payout rates applied to aggregate IRA balances by asset type, contributions and withdrawals are from various SOI sources, and capital gains are estimated using S&P 500 December to December changed applied to the estimated equity share of IRA balances.

[2] The SOI files used here have information about the age of the taxpayer from Social Security records. The information on taxpayer age is not available on the public–use SOI files.

[3] Most theoretical analysis of how IRAs should affect overall saving focuses on the trade–off between the substitution effect from eliminating the tax on the return to saving and the windfall effect for taxpayers already saving above the IRA limits; see, for example, Burman, Cordes, and Ozanne (1990). More recent theoretical analysis in a stochastic setting suggests an important role for penalties, however; see Imrohoroglu, Imrohoroglu, and Joines (1998). For various empirical estimates of how IRAs affect saving, see the symposium consisting of Engen, Gale, and Scholz (1996), Hubbard and Skinner (1996), and Poterba, Venti, and Wise (1996).

[4] For discussion and estimates of the share of saving done through IRAs over time, also see Gale and Sabelhaus (1999).

IRAs from 1985 through 1996. The values for end of year IRA balances are taken from Fronstin (1998). The deductible contributions and taxable withdrawals are taken from published and author tabulated Statistics of Income (SOI) micro data.[5] The interest and dividends are unpublished National Income and Product Accounts (NIPA) estimates based on average market interest and dividend payout rates applied to beginning–of–period IRA balances by asset type.[6] The capital gains are estimated by applying the Standard and Poor's 500 stock index to the estimated equity share of IRA balances, also taken from Fronstin (1998).[7] The final column, estimated rollovers and residual, is the amount needed to reconcile each pair of end of year balances with the reported flows and estimated gains during the year.

Prior to the limits on deductible contributions in the Tax Reform Act of 1986, most of the growth in IRAs was associated with deductible contributions to IRAs, though interest and dividends were also important. More recently, stock market gains are the primary source of growth, accounting for over 30 percent of growth in 1995 and 1996 alone. Deductible contributions have stayed almost flat in nominal terms since the option to make deductible contributions was significantly curtailed by the 1986 Tax Reform Act, so that the share of growth accounted for by contributions has dwindled to near zero.

The remaining source of growth in IRAs, for which no direct data are currently available, is rollovers from 401(k) and other pension plans.[8] As indicated, the last column of Table 1 is the difference between the two end of year balances and all measured flows during the year, and is thus the sum of rollovers and estimation/measurement errors. In particular, the estimates include the errors associated with assigning capital gains incorrectly, and thus the residual plus rollover component is negatively correlated with the estimated gains component. In general, however, the data suggest that rollovers are running something near but less than $100 billion annually, which is generally consistent with the estimates in Yakoboski (1997).

IRA WITHDRAWAL RATES BY AGE

To analyze IRA withdrawal behavior at the household level one needs information about balances and withdrawals for a micro sample. Because those data are not available, the analysis in this section combines two micro data sources that together have the requisite information to produce estimates of withdrawal rates across age groups. Family–level IRA balances are taken from the 1992 and 1995 SCF and taxpayer–level IRA withdrawals are taken from the 1993 through 1996 SOI micro files.[9] Although individuals cannot be

[5] The IRA withdrawal data are only available after 1988 because Form 1040 lumped pension and IRA distributions together prior to that year.

[6] See Park (1996) for a general discussion of NIPA reconciliation of taxable and non–taxable income flows, which is the basis for this estimate.

[7] The equity share is estimated by summing mutual fund and direct stock holdings in IRAs from Fronstin (1998), and dividing by total IRAs. However, because the data is institutionally based, and some money held in mutual funds and brokerages is not invested in stocks, the S&P growth rate is applied to only 80 percent of the mutual fund and stock holdings in each year.

[8] The most promising source of data on rollovers from pensions to IRAs is the Form 1099R retirement income distribution and 5498 IRA information returns provided to taxpayers, as used and described in Yakoboski (1998, 1997, and 1994). The link between information returns and Form 1040 in the SOI sample is still in a nascent stage, however, and no data are available for recent years.

[9] The SCF is actually conducted in the summer and early fall of the respective years; the balances were "aged" to the end of each year using monthly S&P 500 values and the Fronstin (1998) estimate of the share of IRA balances held in equities. For a description of the SCF surveys see Kennickell, Starr–McCluer, and Sunden

matched across the two data sets, inferences can be drawn about cohort–level behavior, because age is a common variable to the two data sets.

The most direct way to estimate the behavioral propensities of interest using the two data sets is to compute the ratio of the relevant SOI flow–variable to the relevant SCF balance–variable by age. For example, given information about the number of taxpayers making withdrawals at a certain age in the SOI and information about the number of families holding IRAs at the same age in the SCF, the estimated propensity to withdrawal is just the ratio of the two numbers. However, sampling variability complicates matters—the sample sizes are too small to support such detailed estimates.

The solution to the sampling–variability problem used here is to "smooth" the data series across the age distribution. The values of IRA balances, withdrawals, and other statistics of interest for each point in the age distribution are presented as "kernel–smoothed" values of all the points in the age distribution within a five year age band, with differential weights applied to points in the age band based on distance from the point being estimated. For example, the total withdrawal estimate for taxpayers 30 years of age is the weighted sum of withdrawals for taxpayers aged 26 to 34, with age 30 getting the highest weights, ages 29 and 31 next highest, ages 28 and 32 next, etc. This smoothing approach shows differences in behavior across age groups with less sensitivity to sampling variability, though some of the changes in behavior that occur at discrete points in the age distribution ($59^1/_2$ and $70^1/_2$) are consequently blurred.

The kernel–smoothing technique, applied to IRA balances in the SCF and taxable IRA withdrawals in the SOI, is used to produce the distributions of withdrawal rates by age shown in Figure 1.[10] The fraction of balances withdrawn from IRAs declines slightly with age in the range where withdrawals are penalized, from 2 to 3 percent when taxpayers are in their 30s to 1 to 2 percent when taxpayers are in their 50s. Withdrawal rates rise, as expected, for taxpayers $59^1/_2$ or older who face no penalties—but the increase is not very large—the kernel–smoothed point estimate for the age 65 withdrawal rate is less than 4 percent of balances. The significant jump in withdrawal rates occur when taxpayers cross the age $70^1/_2$ threshold, at which point minimum distribution requirements become applicable.

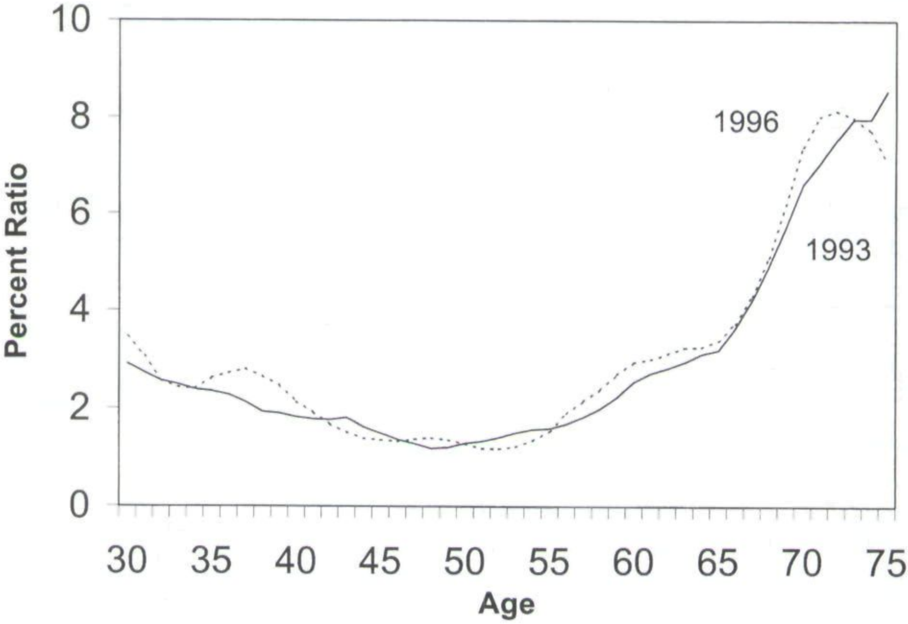
Figure 1 also shows that the overall withdrawal rates for 1993 and 1996 are nearly identical across the age distribution.[11] One way to test the stability of the relationship over this period is to separately calculate withdrawal propensities and average withdrawal to balance ratios

(1997). There is also a slight difference in the sampling units of the SCF and SOI: the SOI is on a tax–return basis, while the SCF is based on "economic units." The main difference is that young, dependent filers in the SOI would show up as part of their parent's economic unit on the SCF, so dependent filers are excluded from the SOI in this analysis. The other difference is single filers living together who would characterize themselves as an economic unit on the SCF—this group is not too large, and in any case, does not hold a large stock of IRAs.

[10] The IRA balances in the SCF have been scaled up so that the aggregate IRA balances in the SCF match the institutional aggregates in Fronstin (1998) that are reported in Table 1. The end of year SCF IRA balance for 1992 was $808.7 billion, while the Fronstin (1998) estimate was $863.8. By 1995, however, the SCF total balance had grown to only $1,078.4 billion, while the Fronstin (1998) value reached $1,352.0 billion. Survey–based aggregates are often lower than institutional measures, for a variety of reasons. In this case, it is probably attributable to the massive surge in stock prices that raised IRA balances more than survey respondents realized, and thus the proportional adjustment seems appropriate.

[11] Of course, some of this stability is to be expected because of the smoothing techniques applied to the data. However, it is important to keep in mind that these are two distinct sets of cross–sections for the two years.

Figure 1. Ratio of IRA Withdrawals to IRA Balances by Age



by age using the 1993 SCF and SOI data sets, then use those to predict 1996 taxable withdrawals. That ex–post simulated value is $44.8 billion, which is only 1.7 percent below the actual $45.5 billion level of withdrawals.

COHORT–LEVEL IRA CONTRIBUTIONS AND ROLLOVERS

Given withdrawal rates estimated using the SCF and SOI data sets together, the other ingredients needed for a cohort–level model of IRA flows and balances are on the accumulation side. Two sources of growth that have a behavioral component are contributions to IRAs and rollovers from pensions to IRAs. Contribution rates and average contributions by age can be measured directly using the SOI, and rollovers from pensions can be estimated using the gap between gross and taxable pension distributions on the SOI, because untaxed distributions are mostly attributable to IRA rollovers.

Figure 2 shows the fraction of tax returns with IRA contributions by age on the 1996 SOI, along with average contributions by age for those making contributions, both smoothed across the age distribution. The fraction making contributions is generally low across the age distribution, because of restrictions associated with income limits and pension coverage. There is some increase in contribution rates after age 50, and rates drop to zero after age $70\frac{1}{2}$, when deductible contributions are prohibited. The average contribution also rises slightly just before retirement, but the effect of the limits on contributions ($2,000 per taxpayer) is evident.

Figure 3 shows the same statistics for rollovers from pensions to IRAs, but here the values are estimated using the gap between gross and taxable pension distributions. One cannot be certain about the fraction being rolled over, but the smaller the taxable amount relative to the gross amount, the more likely it is to be a

Figure 2. IRA Contributions by Age, 1996

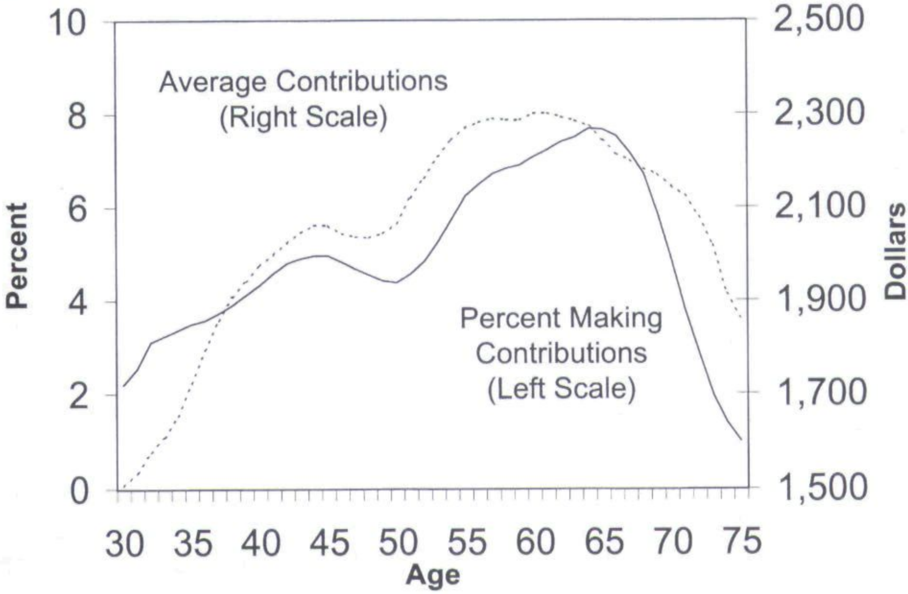
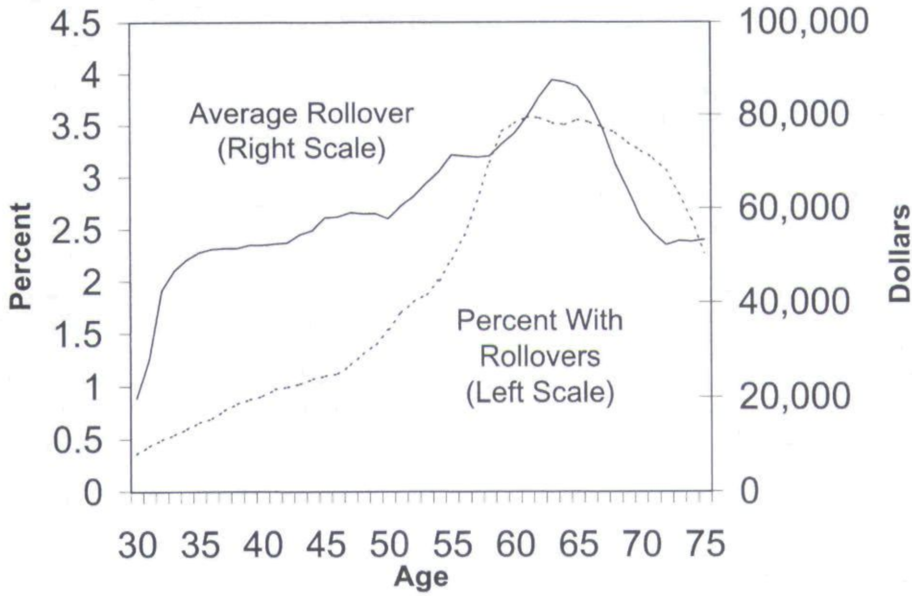


Figure 3. Estimated Lump–Sum Rollovers by Age, 1996



rollover event. Thus, the estimation procedure applied here is that if taxable pensions are less than 25 percent of gross pensions for a given taxpayer, the gap between gross and taxable is assumed to be a rollover. One situation in which this assumption could be invalid is when the gross pension distribution represents a return of after–tax employee contributions; the 25 percent approximation should exclude those cases, however, because few if any pensions have after–tax employee contributions accounting for more than 75 percent of total contributions.[12] In addition, the 25 percent cutoff generates estimates of aggregate rollovers that are consistent with the values in Table 1.

The estimated fraction of taxpayers with pension to IRA rollovers is lower than the fraction making contributions, but average rollovers are much higher. It also makes sense that the fraction of taxpayers with rollovers rises sharply around age 50, which is the point in the life–cycle when cash–outs of retirement or thrift saving plans associated with ending of career jobs are most likely to occur.

Table 1 and Figure 3 together suggest an interesting perspective on IRA growth in the last few years: IRAs have boomed in large part because they are a convenient place for taxpayers to put their employer–sponsored pension wealth upon retiring. It appears that taxpayers are choosing not to take their accumulated pension wealth in the form of an annuity when they retire, and, given the observations on IRA withdrawal behavior reported in the last section, choosing to leave those rolled–over balances in the IRA until forced to make withdrawals. If rollovers from pensions to IRAs were not permitted, much of the impending boom in taxable IRA withdrawals projected in the next section would be characterized instead as an impending boom in pension withdrawals.

PROJECTING IRA FLOWS AND BALANCES

The cohort–level analysis of accumulation and withdrawal patterns above is put to use in this section to build a model for projecting aggregate IRA flows and balances in the near to medium term. The model does not attempt to explain why accumulation and withdrawal rates vary the way they do across age groups; they are simply taken as given. This suggests that the model is useful for simulating outcomes under current law (because behavior can be assumed constant) or in simple policy experiments where reasonable assumptions about changes in behavior can be introduced.

The model forecasts taxable withdrawals across age groups in future years by applying the estimated withdrawal rates to IRA balances by age, where future balances are in turn solved for by accumulating contributions, rollovers, and earnings forward using SCF balances in 1995 as the starting point. The model generally projects strong growth in taxable IRA withdrawals, because the underlying distributions of IRA balances and withdrawal rates by age interact such that IRA withdrawals will continue to grow rapidly even if the return to IRA assets slows from its recent pace. The projected strong growth is also fairly insensitive to changes in the age at which penalty–free withdrawals can begin or the age at which minimum distribution requirements kick in, again, because of the dynamic link between current and future withdrawals.

[12] The distribution of non–taxable pension benefits is very skewed towards taxpayers where virtually the entire distribution is untaxed, suggesting a rollover took place. In 1996, about 90 percent of non–taxable withdrawals occurred for taxpayers for whom less than 25 percent of the gross distribution was taxable, and about 80 percent for whom less than 10 percent was taxable.

A few more identifying assumptions are needed to complete the model of IRA flows and balances. Population weights for the forecast period are assigned using demographic projections for Social Security.[13] Contribution and rollover rates by age are set using the 1996 SOI, and the average values are aged forward using an assumed growth rate of 4 percent, which is the growth rate of average wages for the last few years. The model uses actual data on interest and dividends paid to IRAs along with levels for the S&P 500 to estimate overall returns for 1997 and 1998, the first two simulation years. For years after 1998, the model baseline assumes a reduction in IRA returns to a level roughly equal to the current AAA corporate bond rate, which is 7 percent.

The simulations are also simplified by fixing withdrawal propensities and average withdrawals relative to average balances across four broad population groups corresponding to the distinctions indicated by Figure 1.[14] The four broad age groups are younger than 30, 30 to 58, 59 to 69, and 70 or older. The propensity to make a withdrawal is 11.8 percent for the youngest group, 8.8 percent for the 30-58 year old group, 28.2 percent for the 59 to 69 year old group, and 93 percent for the group 70 and older. However, the fraction of balances withdrawn (given a withdrawal) falls dramatically with age, from 43.1 percent for the youngest, 18.2 percent for those 30 to 58, 13.2 percent for those 59 to 69, and 9.2 percent for those over 70.

Even with the conservative estimates on future rates of return, the underlying micro-dynamics of IRA accumulation and withdrawal suggest strong growth in both the number and dollar value of taxable IRA withdrawals in the near to medium term. Table 2 shows that the number of returns with IRA withdrawals can be expected to grow at a 5–6 percent rate in the next few years, and total withdrawals can be expected to continue growing at double–digit rates. Note that taxable withdrawals are expected to grow faster than

TABLE 2
IRA AGGREGATE BALANCE AND WITHDRAWAL PROJECTS

Year	Number of Returns With Taxable IRAs (Thousands)	Percent Change	Total Taxable IRA Withdrawals (Billions)	Percent Change	End of Year IRA Balances (Billions)	Percent Change
1993	4,383		27,081		993	15.0
1994	4,777	9.0	33,106	22.3	1,079	8.7
1995	5,256	10.0	37,317	12.7	1,352	25.3
1996	5,831	10.9	45,539	22.0	1,599	18.3
1997	6,195	6.2	56,320	23.7	1,967	23.1
1998	6,549	5.7	71,266	26.5	2,344	19.2
1999	6,899	5.4	87,377	22.6	2,536	8.2
2000	7,247	5.0	97,195	11.2	2,737	7.9
2001	7,578	4.6	107,868	11.0	2,949	7.7
2002	7,895	4.2	119,208	10.5	3,172	7.6
2003	8,194	3.8	131,124	10.0	3,407	7.4
2004	8,476	3.4	143,717	9.6	3,653	7.2
2005	8,743	3.2	156,812	9.1	3,912	7.1
2006	9,003	3.0	170,401	8.7	4,183	6.9
2007	9,277	3.0	184,668	8.4	4,467	6.8
2008	9,546	2.9	199,783	8.2	4,764	6.7
2009	9,787	2.5	215,750	8.0	5,078	6.6

[13] The aging factors used here are from the 1997 Social Security Actuaries mid–range population projections.

[14] The results are insensitive to whether the kernel–smoothed or group–level parameters are used in the simulations.

aggregate balances through most of the forecast period, as the large holdings of IRAs by younger and middle age taxpayers become subject to higher withdrawal rates.

Figure 4 shows how sensitive the forecast is to the assumed rate of return. If the return to IRAs is 150 percent of the AAA bond rate—still well below recent experience—the model predicts withdrawals will climb to near $300 billion by 2009, nearly 50 percent higher than in the baseline. Even if the return to IRAs is only 50 percent of the current AAA bond rate, the large stock of existing IRAs and expected strong flow of rollovers combined with aging of the balances suggests withdrawals well above those in any extrapolation–based forecast.

Figure 5 shows the projected effect of two prototype policy changes on taxable IRA withdrawals. The policies considered are (1) lowering the age at which penalty–free withdrawals can be made from $59^1/_2$ to $55^1/_2$, and (2) raising the age at which minimum distributions must begin from $70^1/_2$ to $75^1/_2$. The first simulation assumes that people age 55 to 58 will change their withdrawal behavior to match those 59 to 69, which means they will have a higher withdrawal propensity but lower average withdrawal (given a withdrawal). The second simulation assumes people age 70 to 74 will behave like those 59 to 69, which means a lower withdrawal propensity (they are no longer required to make withdrawals) but slightly higher average withdrawal. As expected, lowering the penalty–free withdrawal age raises taxable withdrawals, and lowering the minimum distribution age raises taxable withdrawals.

The effects of the two policy changes are not that dramatic, however, because of the dynamic link between withdrawals over time. If more withdrawals occur early when the penalty–free withdrawal age is lowered, there are fewer balances to be withdrawn in the future. This result depends crucially on the fact that all balances will eventually get withdrawn in the model, either by the account holder or a descendent who (by law) will make taxable withdrawals at very high rates. Thus, raising the minimum distribution age would temporarily delay but ultimately not change the impending revenue boom from accumulated IRA balances.

Figure 4. Sensitivity of Projected Taxable IRA Withdrawals to Rate of Return

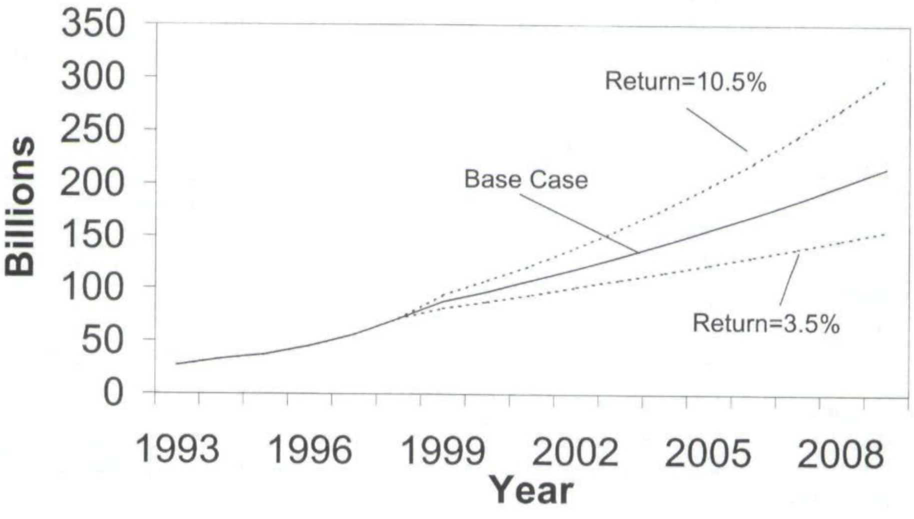
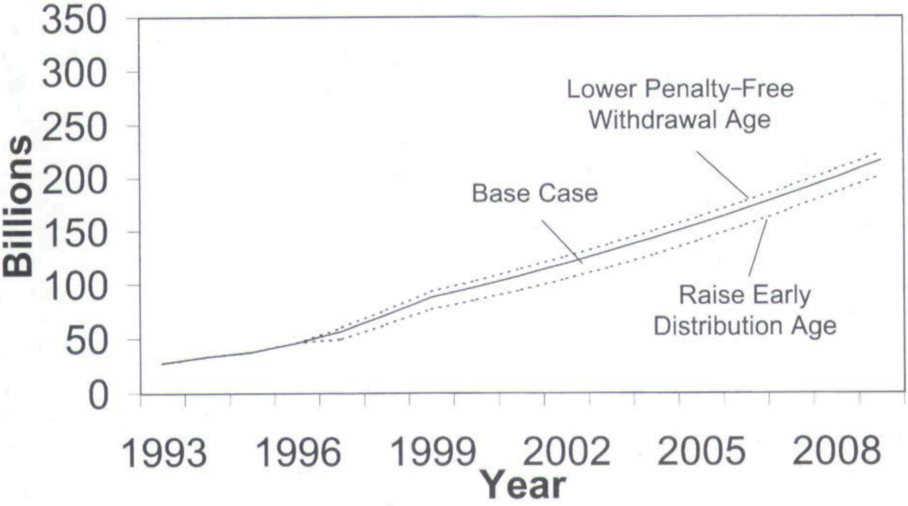


Figure 5. Effect of Two Policy Changes on Projected Taxable IRA Withdrawals



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